Aviation Weather Information Overview and Status

NASA Aviation Safety Program

Weather Accident Prevention Project Review

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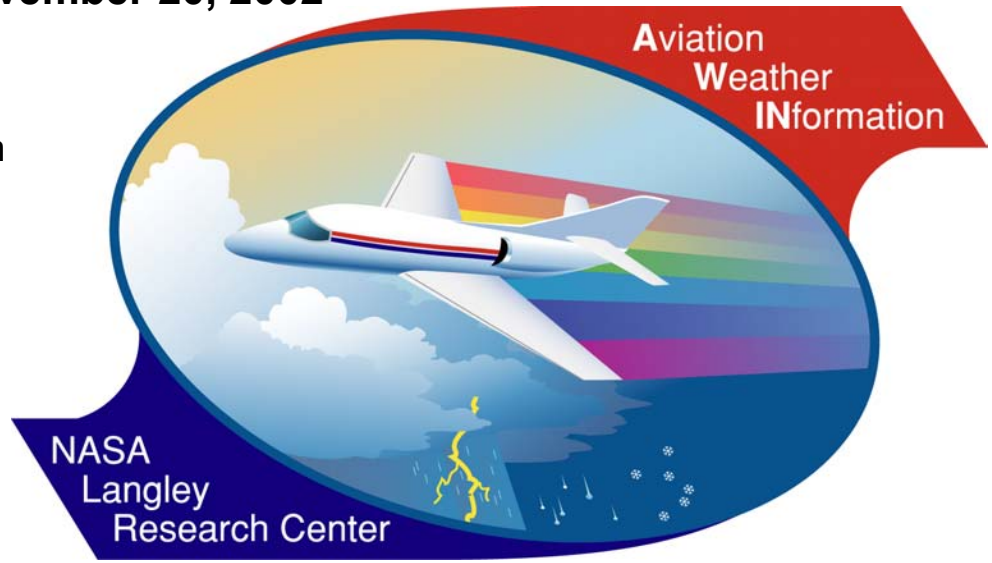

Outline

- **Background**
- **Research Areas**
- **Progress since last year**

Background

- **Weather is a major contributing factor in accidents:**
  - **33% Commercial carrier**
  - **27% General aviation**
- **Many accidents are due to lack of weather situation awareness and poor decisions.**
- **Provision of strategic weather information during the en route phase enables avoidance of adverse conditions.**

Plan

Aviation Weather Information

Goal

Develop technologies and methods for providing pilots with sufficiently accurate, timely and intuitive information during the en route phases of flight which, if implemented, will enable a 25 to 50% reduction in aircraft accidents attributable to lack of weather situation awareness

Objectives

- Develop Needed Weather Products and Sensing Capabilities
- Develop Enhanced Weather Presentations and Decision Aids

Challenges

- Improved Forecasts Need Better Input Data
- Existing Aircraft Need Retrofit Capability
- Pilot Workload Should Not Be Increased
- Diverse Aviation User Groups

Approach

- Use Aircraft and Satellites as Wx Data Collectors
- Develop Technologies for Installed and Portable Systems
- Provide Decision Aids and Operational Guidelines

Aviation Segments

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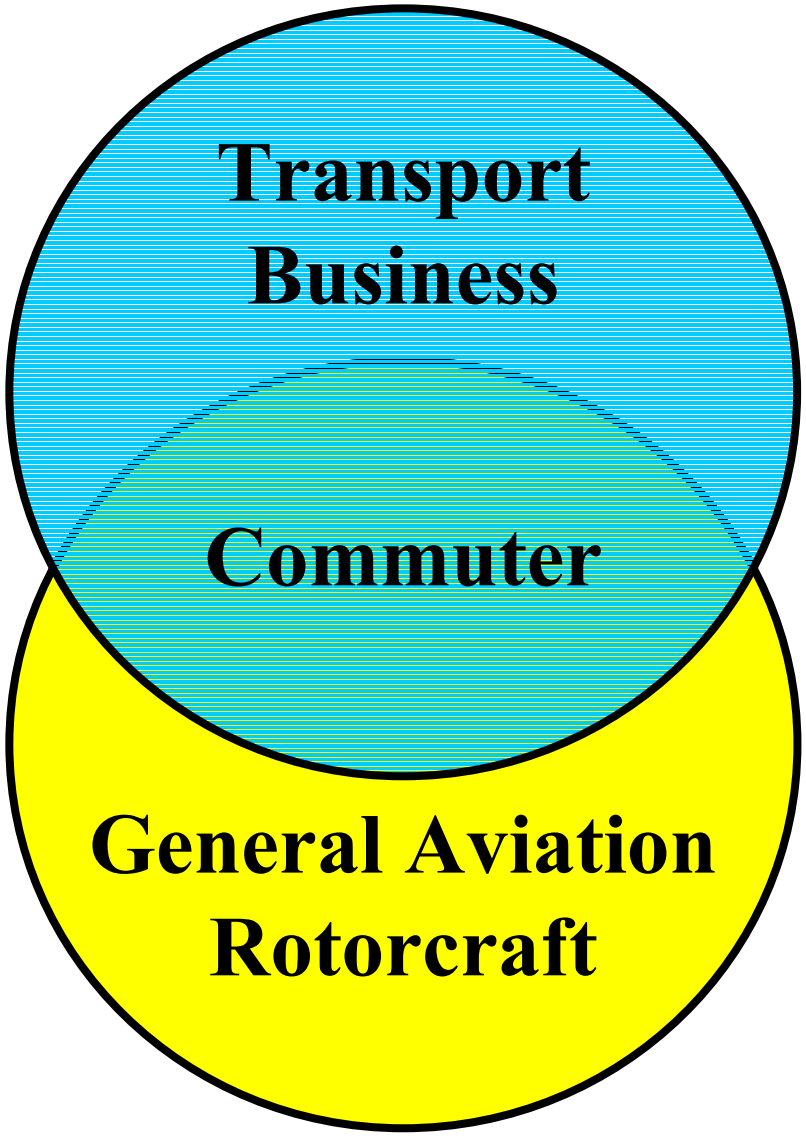

2 Pilots
Above the weather

1 Pilot
In the weather

Product Development Breakdown

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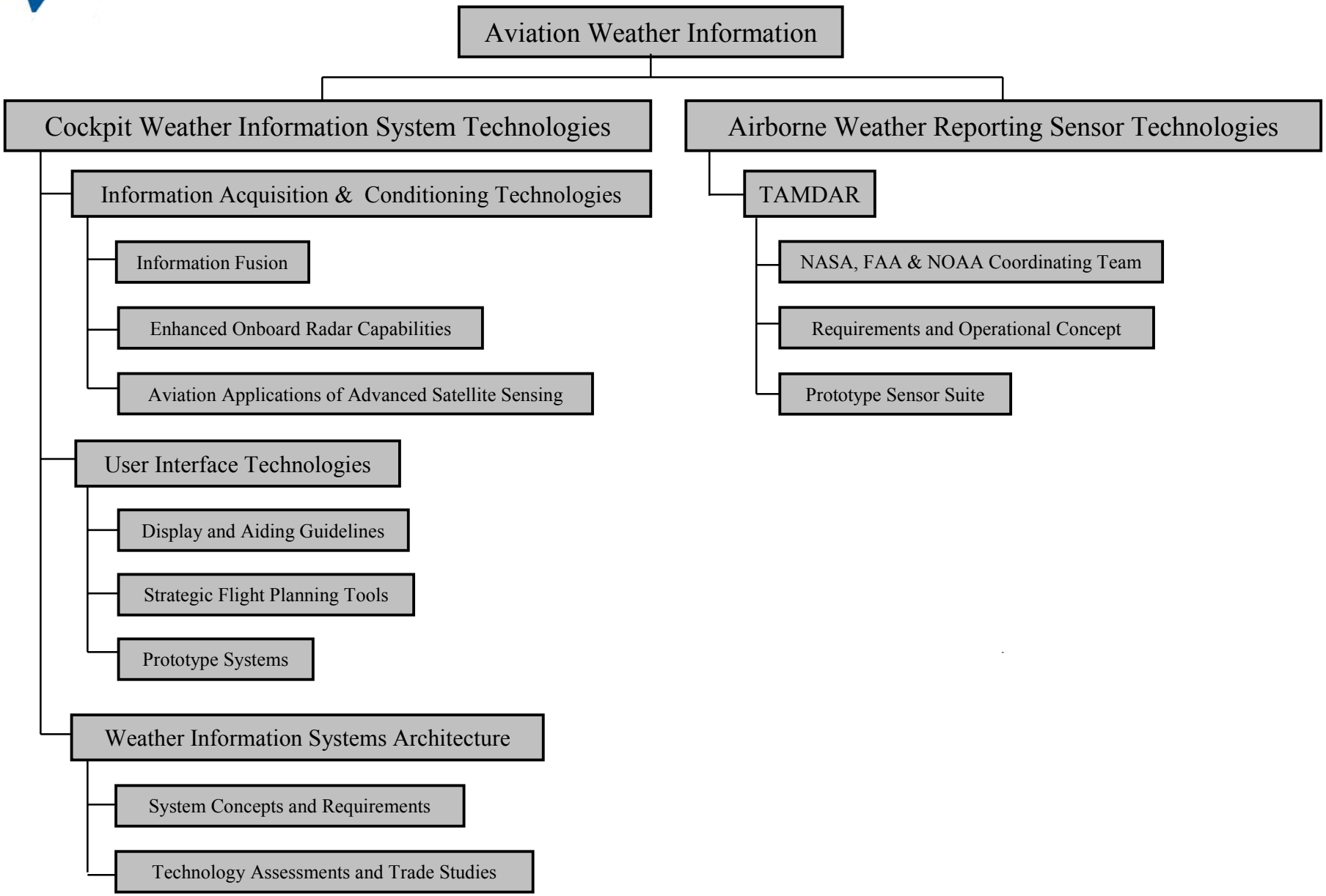

Partnerships

Aviation Weather Information

Flight Standards
Certification
Weather Policy
Weather Products
Flight Information Services

Aviation Weather Center
Forecast Systems Lab

ARNAV

Honeywell

Rockwell Collins

NCAR National Center for Atmospheric Research
University Corporation for Atmospheric Research

Georgia Tech Research Institute

Research Triangle Institute RTI

Old Dominion University

VirginiaTech
Virginia Polytechnic Institute and State University

Cooperative Research

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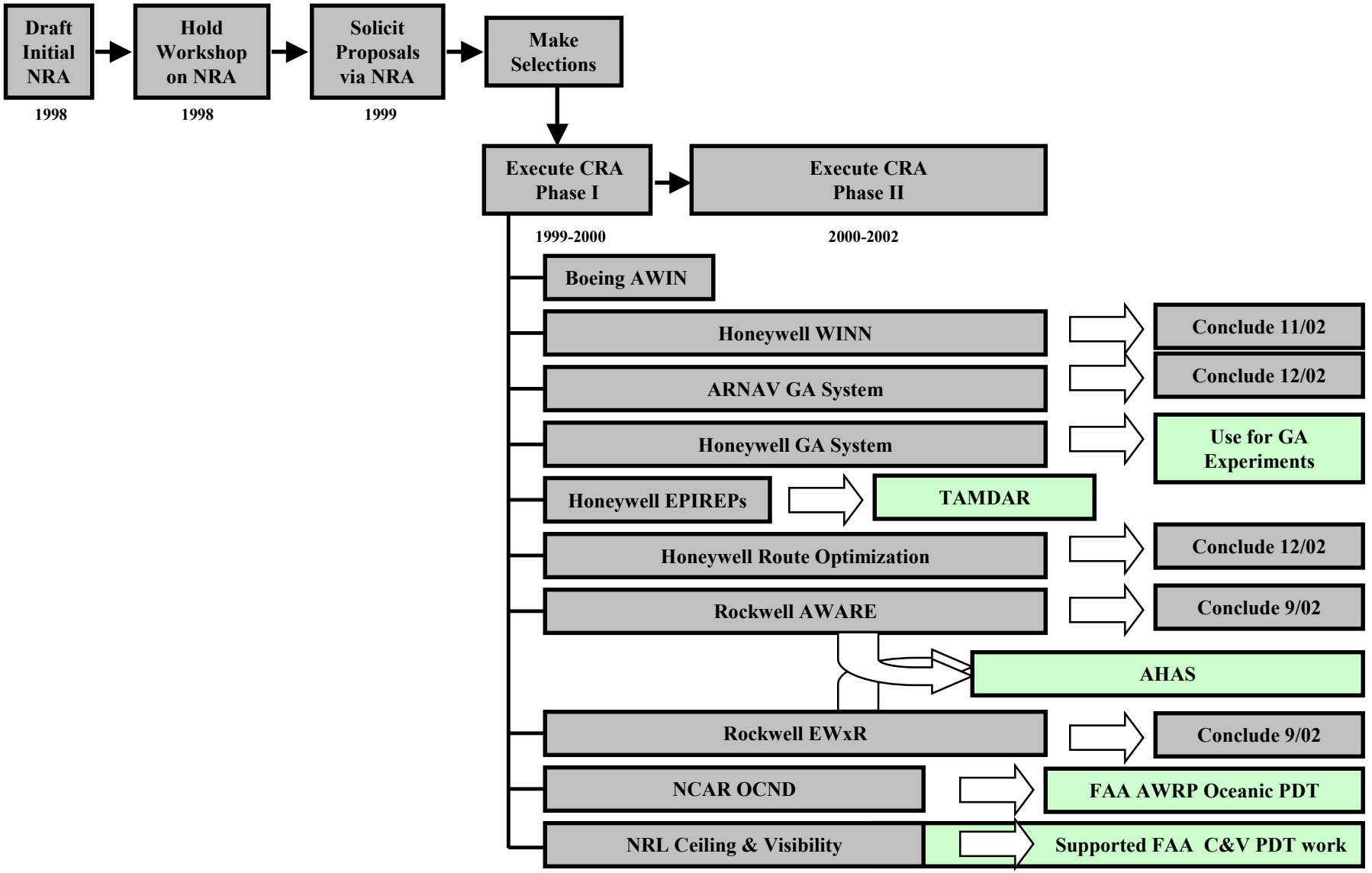

Development of AWIN Capability

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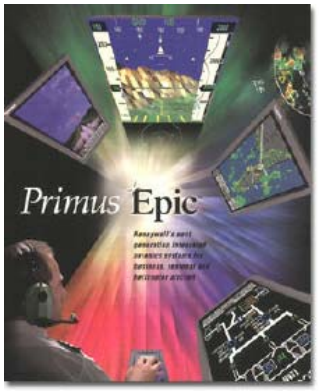
December 2000 - NASA Evaluation of AWIN System on NASA B-757

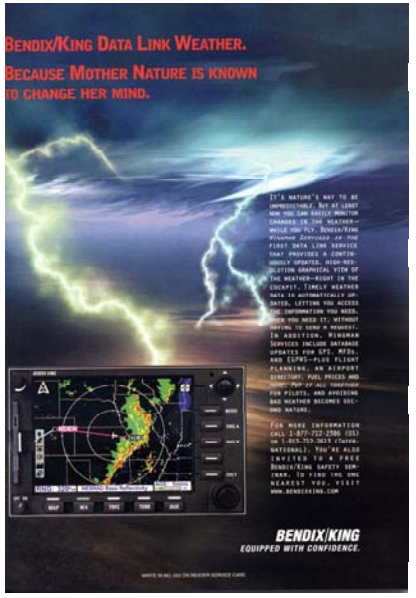
Winter 2001 - In-Service Evaluation by United Airlines on Airbus



Summer 2002 - WINN selected for Honeywell Epic Avionics

Summer 2000 - NASA AWIN General Aviation System Research on NASA B-200 King Air

Summer 2000 - ARNAV General Aviation Data Link Weather Information System



December 2001 - Bendix/King General Aviation Data Link Weather Information System

Cockpit Weather Information Systems

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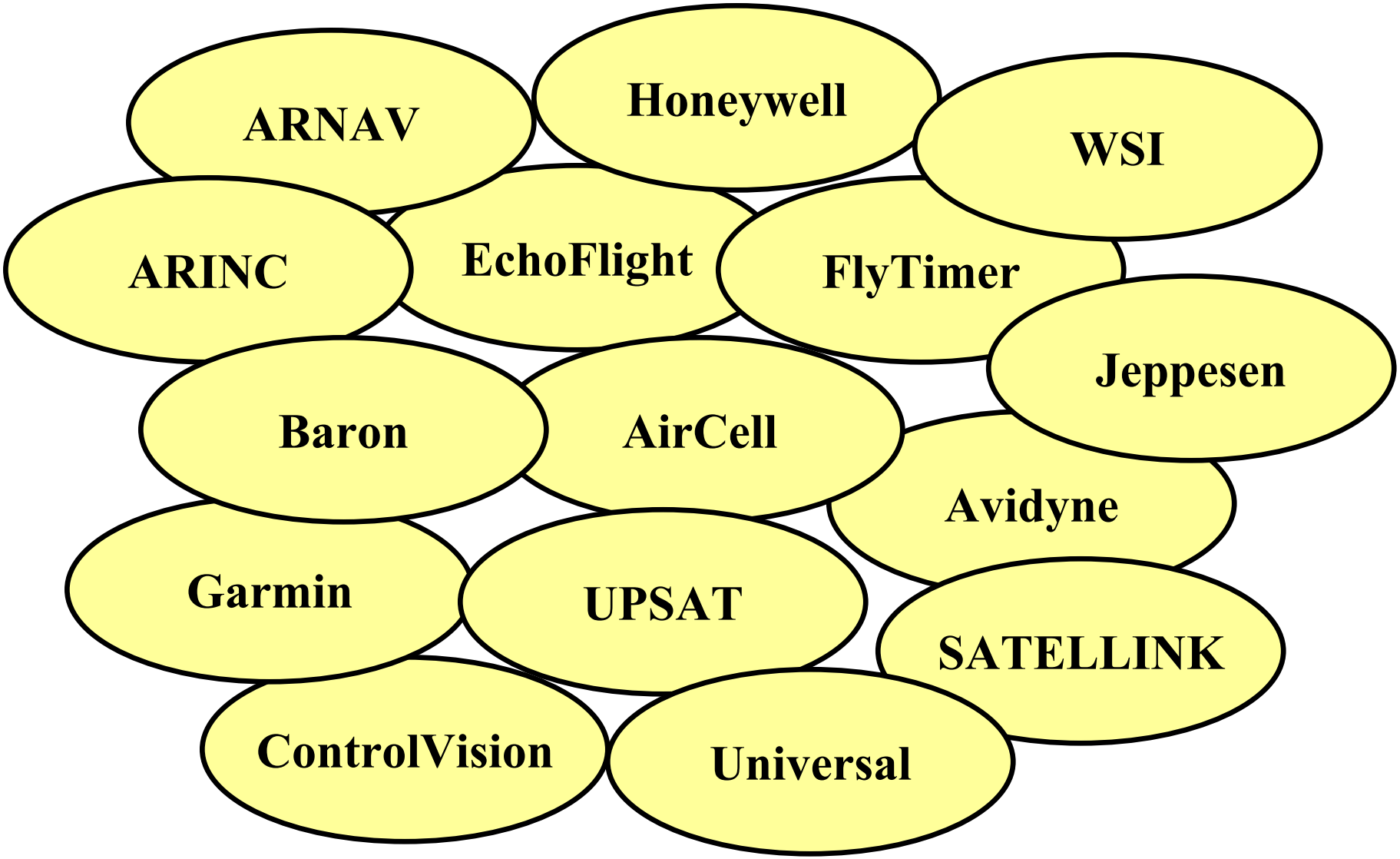

Technology Development

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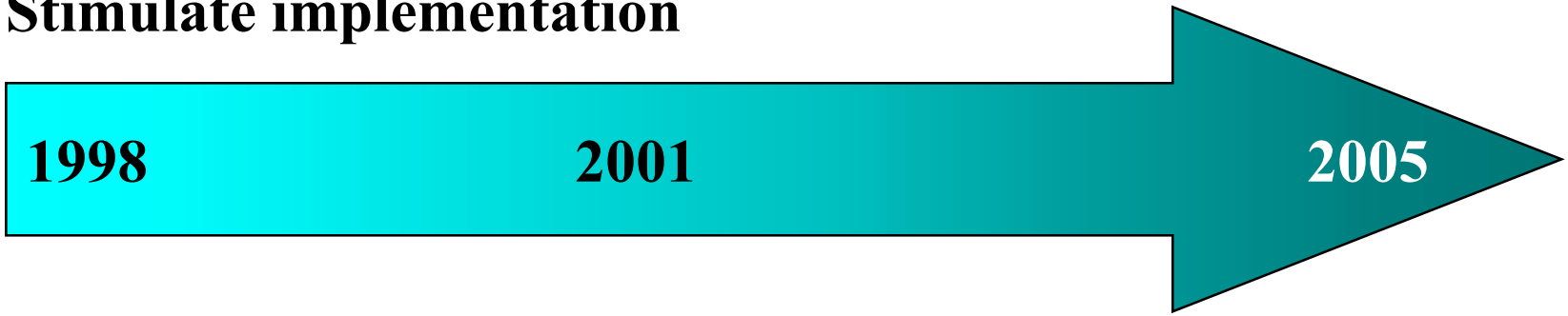
Weather Channel in the Cockpit

Implementation Catalyst

- **Develop viable 1st generation systems**
- **Stimulate implementation**



Information; Not Data

Next generation technologies

- **Data fusion**
- **Alerting and decision aiding**

Accomplishments

- **Flight**
  - **TAMDAR Sensor Suite**
  - **Airborne Hazard Awareness System (AHAS)**
  - **Workload and Relative Position (WARP)**
  - **Convective Weather Sources (CoWS)**
  - **Correlation of Radar Reflectivity and Lightning (CoRRaL)**
- **Simulation**
  - **Ownship Information and NEXRAD Resolution**
  - **NEXRAD Looping and NCWF**

Accomplishments

Aviation Weather Information

- **Advanced Satellite Aviation-weather Products (ASAP)**
- **Means to Improve PIREPS (I-PWR-UP)**
- **Part 135 Weather Safety Standards**
- **Needs of Special Populations**
- **Technology Assessments**
  - **TAMDAR**
  - **ASAP**
  - **Automotive/Trucking Technologies**

Summary

- **NASA is partnered with the FAA, NOAA, industry and academia**
  - **to develop affordable and effective technologies for datalink cockpit weather information systems**
  - **to realize the goal of reducing weather-related accidents**
- **The first generation systems are being fielded**
- **The team is continuing to develop enhancements, operational guidelines and technologies for the next generation of these systems**